

WHAT IS CLAIMED:

1. A communication terminal apparatus connected to an analog communication network, the apparatus comprising:

a line interface circuit configured to connect to the analog communication network and to control the network, convert analog data comprising network control and monitor signals and a modulated signal received from the network into digital data, and convert digital data comprising network control and monitor signals and a modulated signal for transmitting to the network into analog data;

a digital signal processing circuit configured to comprise a network control signal processing section that receives network control and monitor signals from the line interface circuit and a modulation and demodulation processing section that receives a modulated digital signal from the line interface circuit and transmits a modulated digital signal to the line interface circuit;

a digital interface device disposed functionally between the line interface circuit and the digital signal processing circuit and configured to electrically isolate the network control and monitor signals and the modulated digital signals; and

a power-saving control device configured to carry out the operation of the line interface circuit and the network control signal processing section of the digital signal processing circuit and suspend the operation of the modulation and demodulation processing section of the digital signal processing

26 circuit so as to be into a power-saving state when a  
27 predetermined power-saving state change factor has occurred in a  
28 normal operating state, and resume the suspended operation of the  
29 modulation and demodulation processing section of the digital  
30 signal processing circuit when an incoming call signal is  
31 received by the line interface circuit and processed by the  
32 network control signal processing section of the digital signal  
33 processing circuit during the power-saving state.

1 2. The apparatus according to claim 1, further comprising:

2 a clock signal control device configured to halt and resume  
3 supplying an operating clock signal to the modulation and  
4 demodulation processing section according to an instruction from  
5 the power-saving control device;

6 wherein the power-saving control device generates an  
7 instruction to the clock signal control device to halt supplying  
8 the operating clock signal to the modulation and demodulation  
9 processing section so as to halt an operation thereof when the  
10 apparatus changes to the power-saving state, and generates an  
11 instruction to the clock signal control device to resume  
12 supplying the operating clock signal to the modulation and  
13 demodulation processing section so as to resume operation thereof  
14 when the apparatus returns to the normal operating state.

1 3. The apparatus according to claim 1, further comprising:

2 a dedicated signal line configured to transmit a

return-to-the normal operating state request signal from the network control signal processing section to the power-saving control device.

4. The apparatus according to claim 1, further comprising:

a common signal line configured to transmit an interrupt request signal from the modulation and demodulation processing section during the normal operating state, and transmit a return-to-the normal operating state request signal from the network control signal processing section during the power-saving state.

5. The apparatus according to claim 1, further comprising:

a serial communication line configured to be used for a signal transmission from the modulation and demodulation processing section during the normal operating state, and used for a transmission of a return-to-the normal operating state request signal from the network control signal processing section during the power-saving state.

6. A communication terminal apparatus connected to an analog communication network, the apparatus comprising:

line interface means for connecting to the analog communication network, controlling the network, converting analog data comprising network control and monitor signals and a modulated signal received from the network into digital data, and

7 converting digital data comprising network control and monitor  
8 signals and a modulated signal for transmitting to the network  
9 into analog data;

10 digital signal processing means comprising a network control  
11 signal processing section that receives network control and  
12 monitor signals from the line interface means and a modulation  
13 and demodulation processing section that receives a modulated  
14 digital signal from the line interface means and transmits a  
15 modulated digital signal to the line interface means;

16 isolating means disposed functionally between the line  
17 interface means and the digital signal processing means, for  
18 electrically isolating the network control and monitor signals  
19 and the modulated digital signals; and

20 means for carrying out the operation of the line interface  
21 means and the network control signal processing section of the  
22 digital signal processing means and suspending the operation of  
23 the modulation and demodulation processing section of the digital  
24 signal processing means so as to be into a power-saving state  
25 when a predetermined power-saving state change factor has  
26 occurred in a normal operating state, and resuming the suspended  
27 operation of the modulation and demodulation processing section  
28 of the digital signal processing means when an incoming call  
29 signal is received by the line interface means and processed by  
30 the network control signal processing section of the digital  
31 signal processing means during the power-saving state.

1 7. A method for controlling a communication terminal apparatus  
2 connected to an analog communication network, the method  
3 comprising:

4 waiting for an incoming call from the analog communication  
5 network for a predetermined period;

6 carrying out an operation of network control signal  
7 processing and suspending an operation of modulation and  
8 demodulation processing when the predetermined period has passed  
9 without the communication terminal apparatus being in operation;

10 resuming the suspended operation of modulation and  
11 demodulation processing when an incoming call from the analog  
12 communication network arrives at the communication terminal  
13 apparatus;

14 receiving a modulated analog signal from the analog network;  
15 converting the received modulated analog signal into a  
16 received modulated digital signal;

17 electrically isolating the received modulated digital signal  
18 in a digital signal region;

19 demodulating the isolated received modulated digital signal  
20 into demodulated digital data.

1 8. A method of controlling a communication terminal connected  
2 to an analog communication network comprising:

3 providing as a part of the communication terminal a digital  
4 processor having a subsystem that, when in an active  
5 state, demodulates information received from the analog

6 communication network and modulates information for  
7 transmission to the analog network system;  
8 selectively providing a first control signal indicative of a  
9 desired change of the communication processor from a  
10 normal state to a waiting state and, in response  
11 thereto, changing said digital processor subsystem from  
12 an active state in which it demodulates information  
13 received from the analog communication network and  
14 modulates information for transmission to the analog  
15 communication network to a suspended state in which it  
16 consumes less power than in the active state;  
17 selectively providing a second control signal indicative of  
18 a desired change of the communication terminal back to  
19 its normal state and, in response thereto, changing  
20 said digital processor subsystem back to its active  
21 state for receiving and demodulating information from  
22 the analog communication network and for modulating and  
23 sending information to the analog communication  
24 network;  
25 thereby saving power by selectively suspending the operation  
26 of said digital processor subsystem while retaining an  
27 ability to change back to an active state thereof when  
28 needed to receive and demodulate information from and  
29 to modulate and send information to the analog  
30 communication network.

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1 9. A method as in claim 8 in which said digital processor is  
2 driven by clock signals and said changing the digital  
3 processor subsystem to its suspended state comprises  
4 substantially reducing a rate of said clock signals.

1 10. A method as in claim 8 in which said changing the digital  
2 processor subsystem to its suspended state comprises  
3 substantially reducing an amount of power supplied to said  
4 subsystem.

1 11. A method as in claim 8 in which said communication terminal  
2 further comprises a central processing unit (CPU) having an  
3 interrupt request input terminal coupled with said digital  
4 processor and to said analog communication network, said CPU  
5 responding to an interrupt request on said input terminal  
6 when the communication terminal is in its waiting state by  
7 providing information initiating said second control signal,  
8 but responding to an interrupt request on said input  
9 terminal by providing services to said subsystem when the  
10 communication terminal is in its normal state.

1 12. A communication terminal connected to an analog  
2 communication network and comprising:  
3 a digital signal processor having configured to include a  
4 subsystem that, when in an active state, demodulates  
5 information received from the analog communication

6 network and modulates information for transmission to  
7 the analog network system;  
8 a source of a first control signal indicative of a desired  
9 change of the communication processor from a normal  
10 state to a waiting state;  
11 a first control circuit coupled to said source of the first  
12 control signal and said digital signal processor  
13 subsystem and configured to respond to the first  
14 control signal by changing said digital signal  
15 processor subsystem from an active state in which it  
16 demodulates information received from the analog  
17 communication network and modulates information for  
18 transmission to the analog communication network to a  
19 suspended state in which it consumes less power than in  
20 the active state;  
21 a source of a second control signal indicative of a desired  
22 change of the communication terminal back to its normal  
23 state;  
24 a second control circuit coupled with said source of the  
25 second control signal and said digital signal processor  
26 subsystem and configured to respond to the second  
27 control signal by changing said digital signal  
28 processor subsystem back to its active state for  
29 receiving and demodulating information from the analog  
30 communication network and for modulating and sending  
31 information to the analog communication network;



32 thereby saving power by selectively suspending the operation  
33 of said digital signal processor subsystem while  
34 retaining an ability to change back to an active state  
35 thereof when needed to receive and demodulate  
36 information from and to modulate and send information  
37 to the analog communication network.

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1 13. A communication terminal as in claim 12 including a source  
2 of clock signal coupled with said digital signal processor  
3 to drive the processor and with said first and second  
4 control circuits and responding to said control circuits to  
5 supply clock signals at a high rate during said active state  
6 and at a low rate during said suspended state.

1 14. A communication terminal as in claim 12 including a circuit  
2 configured to supply operating power to said digital signal  
3 processor subsystem and with said first and second control  
4 circuits and responding to said control circuits to supply  
5 higher operating power during said active state and low  
6 operating power during said suspended state.

1 15. A communication terminal as in claim 12 in which said  
2 communication terminal further comprises a central  
3 processing unit (CPU) having an interrupt request input  
4 terminal coupled with said second control circuit and with  
5 said analog communication network, said CPU responding to an

6 interrupt request on said input terminal when the  
7 communication terminal is in its waiting state by providing  
8 information initiating said second control signal, but  
9 responding to an interrupt request on said input terminal by  
10 providing services to said subsystem when the communication  
11 terminal is in its normal state.